

Claims

What is claimed is:

1. A method for storing data to a data storage device, the method comprising acts of:
 - (a) receiving a write command issued by a sending interface, the write command
5 being accompanied by data and specifying a storage location on the data storage device to which the data is to be recorded;
 - (b) upon receipt of the data by the data storage device, storing the data to a first cache memory;
 - (c) transferring the data from the first cache memory to a second cache memory; and
 - 10 (d) transferring the data from the second cache memory to the specified storage location pursuant to the write command.

2. A method as defined in claim 1, wherein the transferring act (c) is performed in response to a predetermined threshold condition being satisfied.

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3. A method as defined in claim 2, wherein the predetermined threshold condition relates to a predetermined percent capacity of the first cache memory being used, the transferring act (c) comprising:
 - transferring the data from the first cache memory to the second cache memory if a current
20 percentage of storage capacity of the first cache memory being used is greater than or equal to the predetermined percent capacity.

4. A method as defined in claim 2, wherein the predetermined threshold condition relates to a predetermined percent capacity of the first cache memory being available, the
25 transferring act (c) comprising:

- transferring the data from the first cache memory to the second cache memory if a current percentage of available storage capacity of the first cache memory is less than or equal to the predetermined percent capacity.

- 30 5. A method as defined in claim 2, wherein the predetermined threshold condition relates to whether the sending interface has issued a flush command requesting that the first cache memory be cleared of all data, the transferring act (c) comprising:

transferring the data from the first cache memory to the second cache memory upon receipt by the data storage device of the flush command.

6. A method as defined in claim 2, wherein the predetermined threshold condition
5 relates to whether data storage and retrieval operations of the data storage device are idle, the transferring act (c) comprising:

transferring the data from the first cache memory to the second cache memory during a time when data storage and retrieval operations of the data storage device are idle.

10 7. A method as defined in claim 1, wherein the transferring act (d) is performed in response to a predetermined threshold condition being satisfied.

8. A method as defined in claim 7, wherein the predetermined threshold condition
relates to a predetermined percent capacity of the second cache memory being used, the
15 transferring act (d) comprising:

transferring the data from the second cache memory to the specified storage location if a current percentage of storage capacity of the second cache memory being used is greater than or equal to the predetermined percent capacity.

20 9. A method as defined in claim 7, wherein the predetermined threshold condition relates to a predetermined percent capacity of the second cache memory being available, the transferring act (d) comprising:

transferring the data from the second cache memory to the specified storage location if a current percentage of available storage capacity of the second cache memory is less than or equal
25 to the predetermined percent capacity.

10. A method as defined in claim 7, wherein the predetermined threshold condition
relates to whether the sending interface has issued a flush command requesting that the second
cache memory be cleared of all data, the transferring act (d) comprising:

30 transferring the data from the second cache memory to the specified storage location upon receipt by the data storage device of the flush command.

11. A method as defined in claim 7, wherein the predetermined threshold condition relates to whether data storage and retrieval operations of the data storage device are idle, the transferring act (d) comprising:

transferring the data from the second cache memory to the specified storage location
5 during a time when data storage and retrieval operations of the data storage device are idle.

12. A program storage device readable by a computer system tangibly embodying a program of instructions executable by the computer system to perform the method of claim 1.

13. A method for managing the storage of a plurality of data packets to a data storage device, the plurality of data packets being sent to the data storage device by a sending interface and accompanied by a write command specifying a plurality of storage locations on the data storage device to which the plurality of data packets are to be recorded, wherein each of the plurality of storage locations is allocated a predetermined quantity of storage capacity on the data storage device, the method comprising acts of:

- (a) receiving the plurality of data packets;
- (b) storing the plurality of data packets to a first cache memory;
- (c) if one or more of the plurality of data packets are to be stored to a single storage location in a manner such that the one or more of the plurality of data packets will utilize all of the predetermined quantity of storage capacity allocated for the single storage location, transferring the one or more of the plurality of data packets to the single storage location; and
- (d) if one or more of the plurality of data packets are to be stored to a single storage location in a manner such that the one or more of the plurality of data packets will not utilize all of the predetermined quantity of storage capacity allocated for the single storage location, transferring the one or more of the plurality of data packets from the first cache memory to a second cache memory for subsequent transfer to the single storage location.

14. A method as defined in claim 13, further comprising:

- (e) in response to the transferring act (d), transferring the one or more of the plurality of data packets from the second cache memory to the single storage location.

15. A method as defined in claim 14, wherein the transferring act (e) comprises:

- (e)(i) reading a plurality of data entries stored on the single storage location and caching the plurality of data entries to a first memory;
- (e)(ii) modifying the plurality of cached data entries by replacing one or more of the plurality of cached data entries with the one or more data packets, wherein at least one of the plurality of cached data entries is not replaced; and
- (e)(iii) writing the modified plurality of data entries to the single storage location.

16. A method as defined in claim 13, wherein the transferring act (d) is performed in response to a predetermined threshold condition being satisfied.

17. A method as defined in claim 16, wherein the predetermined threshold condition relates to a predetermined percent capacity of the first cache memory being used, the transferring act (d) comprising:

5 transferring the data from the first cache memory to the second cache memory if a current percentage of storage capacity of the first cache memory being used is greater than or equal to the predetermined percent capacity.

18. A method as defined in claim 16, wherein the predetermined threshold condition
10 relates to a predetermined percent capacity of the first cache memory being available, the transferring act (d) comprising:

transferring the data from the first cache memory to the second cache memory if a current percentage of available storage capacity of the first cache memory available is less than or equal to the predetermined percent capacity.

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19. A method as defined in claim 16, wherein the predetermined threshold condition relates to whether the sending interface has issued a flush command requesting that the first cache memory be cleared of all data, the transferring act (d) comprising:

transferring the data from the first cache memory to the second cache memory upon
20 receipt by the data storage device of the flush command.

20. A method as defined in claim 16, wherein the predetermined threshold condition relates to whether data storage and retrieval operations of the data storage device are idle, the transferring act (d) comprising:

25 transferring the data from the first cache memory to the second cache memory during a time when data storage and retrieval operations of the data storage device are idle.

21. A method as defined in claim 13, wherein the one or more of the plurality of data packets comprise(s) a quantity of data bytes less than a quantity of data bytes that may be stored
30 in the predetermined quantity of storage capacity allocated for the single storage location.

22. A method as defined in claim 13, wherein the one or more of the plurality of data packets is one data packet comprising a quantity of data bytes substantially equal to a quantity of data bytes that may be stored in the predetermined quantity of storage capacity allocated for the single storage location.

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23. A program storage device readable by a computer system tangibly embodying a program of instructions executable by the computer system to perform the method of claim 13.

24. A data storage device for storing data received pursuant to a write command issued from a sending interface to the data storage device, the write command specifying a storage location on the data storage device to which the data is to be recorded, the data storage device comprising:

5 a first cache memory for temporarily storing the data upon receipt of the data from the sending interface; and

means for storing the data for subsequent transfer to the specified storage location, wherein the storing means receives the data from the first cache memory in response to a first threshold condition being satisfied.

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25. A data storage device as defined in claim 24, wherein the first threshold condition relates to whether data storage and retrieval operations of the data storage device are idle.

26. A data storage device as defined in claim 24, wherein the first threshold condition
15 relates to a predetermined percent capacity of the first cache memory being used.

27. A data storage device as defined in claim 24, wherein the storing means comprises:

20 means for transferring the data to the specified storage location in response to a second threshold condition being satisfied.

28. A data storage device as defined in claim 24, wherein the specified storage location is located on a data storage disc, the storing means being located on a portion of the data storage disc.

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29. A data storage device as defined in claim 28, wherein the storing means is located on an outer circumferential portion of the data storage disc.

30. A data storage device as defined in claim 24, wherein the specified storage
30 location is a sector on a data storage disc, the sector being allocated a predetermined quantity of storage capacity on the sector, and wherein the data is formatted as a packet comprising a

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quantity of data bytes less than a quantity of data bytes that may be stored in the predetermined quantity of storage capacity.